

ENERGY JUSTICE IN CLIMATE CHANGE ADAPTATION: Recommendations for Western States Adapting to Increased Wildfire Risk

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EXECUTIVE SUMMARY

Rebalancing the relationship between human-focused development and the natural world will require policy and behavioral changes at the individual and community level over the short, medium, and long term. This policy brief presents high-level recommendations for state and local policy, enacted in the short (1-3 years) and medium (3-10 years) term. These non-exhaustive recommendations work in parallel with proposed federal policy, such as a Green New Deal, which would restructure the U.S. economy to be more sustainable, resilient, and equitable. We use an energy justice frame in our analysis, a framework which “centers the concerns of marginalized communities” in the energy system and “aims to make energy more accessible, affordable, clean, and democratically managed.”¹ We focus on energy infrastructure, generation, access, and affordability in our analysis, while recognizing the interconnected nature of energy, resilience, safety, jobs, and health. Our focus is on western states (specifically Arizona, California, Colorado, Idaho, Nevada, Oregon, Utah,

and Washington), which are in varying stages of recognizing and adapting to wildfire risk and the resulting energy infrastructure concerns.

Each state should have a **well-defined strategic plan to adapt to the effects of climate change as they relate to energy systems and wildfire risk**. Adaptive governance principles should be followed, integrating federal, regional, state, local, and tribal governments. The plan should be developed collaboratively through an equitable process with most-impacted communities and should, at a minimum, include the following areas:

1. **Funding structures to enact this plan must not be regressive or unsustainable** – dedicated revenue sources should be allocated to land management practice, infrastructure upgrades, investment in renewable energy generation and storage, and support payments for those affected by wildfires or planned power shutoffs.
2. **Utilities must proactively plan for more resilient, distributed, renewable energy systems**. Purposeful power shutoffs as a wildfire mitigation strategy, if utilized, must follow a planned phase-out of their use.
3. **Local resilience must be prioritized, accessible, and supported** through community-led planning of community resource centers, investment in public health agencies, and facilitating a network of information.
4. The principles of **impacted-community governance, transparency, data justice, and accountability** must be centered in order to make informed decisions that respect the rights to both life and privacy.

We conclude by evaluating California’s wildfire, energy, and climate change adaptation policies against our recommendations, highlighting areas where states might learn from one another and collaborate in regional partnership or information-sharing endeavors. Finally, we note that climate change adaptation will be necessary in all areas of the United States, with different risks and infrastructure based on regional context. Parts of our analysis are applicable to different regions, while certain recommendations are specific to western states. We highlight areas that might be applied to other regions, and briefly discuss the differing challenges these regions might face.

I. INTRODUCTION

In September 2020, a wildfire tore through the southern Oregon towns of Phoenix and Talent, leaving over 2,600 homes and businesses destroyed.² Rogue Climate, a local climate justice organization based in southern Oregon, compiled mutual aid resources and services for their neighbors, even though the organization’s office was one of the buildings that burned down during the wildfire.³ The connection is not lost on Rogue Climate, which has been organizing for years against fossil fuel infrastructure projects and for economic and environmental justice for their community. Months later, many people who lost their homes due to the wildfire are being denied wildfire disaster assistance from FEMA – denial rates are higher for low-income people, and the application process is difficult for seasonal workers without childcare, people who need translation services, and residents of mobile homes.⁴

For communities in the western United States, the wildfires during 2021 and 2020 were piled on top of multiple intersecting stressors. The COVID-19 health crisis ripped through households, disproportionately affecting communities of color; the accompanying economic depression left millions out of work and exposed essential workers whose jobs require in-person activities, who travel on public transportation, and who live in multi-generational households (disproportionately Black, Indigenous, Latinx, and Hispanic) to the risks of contracting COVID-19; pandemic lock-downs and isolation worsened mental health, especially in children and the elderly; working mothers were pushed out of the workforce due to increased caretaking


responsibilities; and the public murder of Black people by police led to massive protests and organizing movements all over the United States against police violence, increasing public attention on the links between race and health.⁵

And underneath these issues, there is the increasingly obvious fact that climate change is making wildfires more dangerous and frequent, with dry conditions and longer summers. State and federal land management practices are also contributing to the problem – fire suppression supplanted indigenous land management strategies, such as controlled burns, and people have increasingly moved into areas where wildfires threaten their lives and property.⁶ Indigenous land-back movements advocate for an end to violence against

land, water, air, plants, and animals, honoring and enforcing treaty agreements, and a respectful relationship between humans and the nonhuman world. Such movements are integral to a healthy, sustainable future.

Wildfire adaptation and mitigation is a complex issue, and requires that we consider land management practices, fire suppression tactics, community planning and development, housing density, construction, and affordability, energy infrastructure transformation, and adaptive governance. Some adaptation practices can be implemented in the short- and medium-term, which are the time-frames we are predominantly concerned with in this policy brief. However, the long-term approach to adapting to climate change in the western United States will require shifting land management practices over decades and centuries. Further development into wildland areas, or the wildland-urban interface, must be curbed, and existing development in these areas must be carefully adapted to the risks of climate change, or relocated. For example, California has made some steps towards working with local communities to target development where housing, energy, water, and sewer infrastructure already exist in order to reduce sprawl into the wildland-urban interface.⁷ This does not mean that population growth and community investment should be guarded against; rather, housing should be made denser, more energy efficient, and more affordable in order to increase the impact of renewable energy generation and storage implementation; public transportation should reduce pollution and increase transit ridership and mobility; a just transition framework should be applied to the energy transition, centering environmental justice, the development of safe, well-paying union jobs, and community leadership and investment.

This policy brief presents short- and medium-term recommendations for western states adapting to the effects of climate change. We evaluate California's wildfire, energy, and climate change adaptation policies using the set of evaluation metrics discussed in each section, and highlight areas where states can enact adaptation policy. Our first recommendation is a prerequisite for the subsequent ones: states must develop strategic plans that outline a comprehensive, systemic, and adaptive approach to increased wildfire. The following areas of recommendations should be included in state strategic planning: funding structures to support adaptation policy; utility planning and infrastructure investments; community-led local resilience; and



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community governance, transparency, data justice, and accountability in adaptation policy, including power shutoffs. While this policy brief is primarily concerned with actions taken at the state level, adapting to climate change is inherently a multi-jurisdictional endeavor. Some recommendations might be better suited to local governments, utilities, regional entities, or other actors. States can take leadership on each of these issues, by providing funding, best practices, and assistance in enacting these recommendations. Finally, we acknowledge that the topics discussed in this policy brief are deeply complicated and interconnected; this policy brief is not meant to be comprehensive or prescriptive, but a tool that can be utilized by community-based organizations and policy-makers to guide adaptation policy in a more just, equitable, regenerative direction. It is crucial that the recommendations in this policy brief are applied in a top-down manner, but in relationship with community members, with a focus on community leadership in shaping, enacting, and evaluating policy. This is especially necessary when developing policies on local resilience.

II. STATE STRATEGIC PLANNING

The process of strategic planning is important in both private and public sector planning. Agency strategic plans are crucial tools for identifying priorities, assigning resources to enact those priorities, and evaluating results.⁸ The cyclical nature of electoral politics only enhances the need for a strategic plan that can align action across administrations.

The Municipal Research and Services Center, a nonprofit organization based in Washington state, outlines the basics of strategic planning for local governments.⁹ The process of developing a strategic plan includes developing a vision statement, informed by community participation, and a mission statement which describes how to achieve that vision. The Government Finance Officers Association emphasizes the need to link financial and budget planning with strategic planning, in order to align spending and goals.¹⁰ The EPA has also provided guidance for states to create a climate change action plan, recommending that states include the following: regional and local climate risks and vulnerabilities; baseline greenhouse gas emissions; goals and targets; alternative policy options; identification and screening of mitigation actions; forecasted impacts of mitigation actions; and recommendations and strategy for implementation.¹¹ For western states, the regional climate risks and vulnerabilities undoubtedly include the risk of wildfire, and the adaptation measures necessary to reduce this risk are just as important as a plan to reduce greenhouse gas emissions. The Pew Center on Global Climate Change advocates for a separate and comprehensive adaptation process, though some states include adaptation planning in their emissions reduction plan.¹²

We recommend that states at risk of increased wildfire should assign responsibility for putting together a strategic plan to either a state agency or an office of the executive branch. This strategic plan should be updated at regular intervals, and should include both overarching principles and measurable benchmarks towards attaining these goals. The strategic plan should be based on principles of justice and equity, so that the costs and benefits of the strategic plan are not distributed in a way that reinforces existing inequities. For example, some measurable, meaningful amount of resources appropriated to the strategic plan programs (such as home energy efficiency retrofits, workforce development, or ecosystem management activities) should be allocated to low-income communities, minority communities, and communities vulnerable to environmental, energy, and climate injustice. The strategic plan should be constructed with meaningful, equitable, and substantive community input and direction, in order to ensure that its goals, metrics, and programs are improving conditions for communities and individuals. The plan should be implemented with transparency, in order to encourage accountability for the state reaching its measurable benchmarks — especially those regarding disadvantaged communities. Funding should be allocated, or appropriated, for

implementing this strategic plan. The plan should cover all relevant levels of governance, including federal, regional, state, municipal, city, and tribal governance entities.

Evaluation Metrics:

- A state-level strategic plan exists, with either periodic updates, or plans to periodically update the document. A state agency has ownership of development over this plan.
- The strategic plan includes climate change adaptation strategies and incorporates the principles of justice, equity, transparency, and accountability in process and benchmarks.
- Funding is associated with the implementation of the strategic plan.

III. FUNDING STRUCTURES

Wildfire response has increasingly consumed state and federal budgets, with fuel reduction and fire suppression activities receiving the majority of the funding allocated to wildfire-related activities. This is clearly an unsustainable path – as wildfires become more widespread and destructive, this funding requirement will only increase.

States have used a variety of approaches to fund wildfire-related programs. States generally mix federal reimbursement, state-level funding, and other sources of reimbursements for the cost of wildfire management and suppression activities.¹³ The variation in wildfire frequency, intensity, and scope over the years results in variable suppression costs, complicating any attempt to budget for wildfire costs at the state and federal level. The costs of non-suppression related activities (such as fuel reduction, land management, prescribed burn programs) may in turn vary from year to year, based on available funding.

The most common method of funding wildfire suppression costs is appropriating state General Funds, either before the fire season as a baseline funding source, or after the fire season, to cover the costs that were not reimbursed by FEMA or other sources.¹⁴ This funding might be appropriated in the fiscal year following a wildfire, or costs may be covered using a budget surplus, deficit spending, or supplemental appropriations. Cost recovery due to legal action is supported by most western states, but not often used as a significant source of funding. Recently, the California Public Utilities Commission (CPUC) levied a \$200 million penalty on Pacific Gas & Electric for the utility's role in causing a series of wildfires in 2017 and 2018 that killed over 100 people and caused immense property damage; however, even after successful, costly litigation against the utility, the fine was ultimately waived, highlighting the inadequacy of relying on revenues from responsible parties as a method of supporting wildfire programs.¹⁵

There are alternative funding sources used by western states to fund wildfire management programs. Some states use landowner assessments to cover part of the cost of wildfire prevention and suppression activities. These fees, generally charged to people who own forested land, might vary based on the location of the land. For example, Oregon levies higher fees on landowners in the wildland-urban interface.¹⁶ Oregon leverages General Fund appropriations, landowner fees, timber harvesting and sale taxes, and an insurance policy to cover costs of wildfire suppression.¹⁷ The \$4.1 million annual premium cost for the state is paid for by a mix of appropriation funding and landowner fees; the state then pays the first \$50 million in annual wildfire suppression and rebuilding costs, while the insurance company pays the next \$25 million, with any additional costs (which would likely trigger federal reimbursement) covered by the state.¹⁸ In general, Oregon has saved money by using this insurance policy, with total revenue from insurance claims exceeding the annual premiums between 1973 and 2015.¹⁹ States or entities that adopt some type of insurance program may be incentivized to increase energy system resilience and reduce vulnerability to the effects of climate change by their insurance policy.²⁰

California has taken a slightly different approach, allowing investor-owned utilities (IOUs) to opt into a wildfire disaster fund that can be used to repair damaged infrastructure due to a wildfire.²¹ California has also enacted legislation that directs \$200 million each year from the state's Greenhouse Gas Emissions Fund (consisting of revenue collected from the state's cap and trade program) to fund wildfire prevention activities, including forest health and fuel reduction.²² Washington and Colorado have disaster funds set up, with revenues from appropriations, at the state and federal level, and other sources.²³

Resilience bonds offer a potential new tool that states can use to stabilize wildfire-related budgets and redirect funding toward land and forest management, instead of relying solely on fire suppression. The Blue Forest Conservation developed a "Forest Resilience Bond" in partnership with the World Resources Institute; this bond allows private entities to purchase bonds through a private-public partnership with federal, state, local, and tribal governments, utilities, or other stakeholders. The Blue Forest Conservation's first resilience bond was launched in 2018, and the \$4 million investment is currently being used to finance ecological restoration treatments in the Tahoe National Forest, with repayment through the state and a municipal water and hydroelectric utility partner.²⁴

It is crucial that states fund holistic wildfire management practices, not focusing solely on fire suppression.

There are many funding mechanisms not touched on here which states may explore in order to fully finance climate change adaptation activities; we caution that our description and approach are not comprehensive. Many climate change adaptation activities are currently funded through payments by ratepayers of utilities, a system that has shown itself to be inadequate in the face of the massive societal shifts necessary to mitigate and adapt to climate change. Our intention here is to provide examples of alternative funding mechanisms currently being explored by western states, and to outline guiding principles of climate change adaptation funding mechanisms. Further discussion of utility funding mechanisms is in Section IV.

Aside from funding mechanisms and revenue sources, it is crucial that states fund holistic wildfire management practices, not focusing solely on fire suppression. This includes funding prescribed burning programs that draw on indigenous leadership and knowledge of the practice; ecosystem restoration projects that target the health and wellbeing of vulnerable communities by improving water, soil, and air quality; and building individual and community resilience in the face of wildfires or energy grid failures.²⁵

Evaluation Metrics:

- Funding is ongoing, sustainable, and adequate to meet costs.
- Fire suppression funding is kept separate from other wildfire-related activities, such as fuel reduction, prescribed burning, infrastructure hardening, grid resilience, and ecosystem health.
- Funding is progressive, not burdening vulnerable populations disproportionately.
- Funding is available for communities and municipalities to develop resilience centers that provide information and training during normal times, as well as resources and access to power during and after disasters.
 - Resilience centers should have the capacity to operate separately from the grid, meaning they should have solar panels, energy storage, and other distributed renewable energy resources.
 - Resilience centers should be housed within existing, trusted organizations whenever possible; these organizations should have decision-making power in the development and utilization of these resilience centers.

IV. UTILITY INVESTMENTS AND DECISION-MAKING

Utilities have generally been responsible for the cost of all infrastructure maintenance and upgrades, and have passed these costs directly to their ratepayers as “reasonable costs.” While many utilities are beginning to incorporate the expected effects of climate change into their decision-making processes, this strategy generally utilizes state-funded climate change scientific research and adaptation planning tools, which highlights the importance of state-led adaptation efforts.²⁶ It is becoming ever more clear that utilities are ill-equipped to manage the infrastructure changes that will be necessary to adapt to climate change – many utilities struggle just to complete basic maintenance and upgrades on their equipment, and PG&E’s bankruptcy provides a worst-case scenario of utility mismanagement.

Several western states (California, Nevada, Washington, and Oregon) have decoupled utility revenues from energy production and delivery to consumers, in order to encourage utilities to pursue energy efficiency measures.²⁷ This increases the authority that state oversight entities — generally the state’s public utilities commission — might have over how a utility’s adaptation activities are financed by ratepayers. Some have argued that ratepayers living in the wildland-urban interface should pay higher rates, as the cost of providing utility service to these consumers is very high, and increases the risk of wildfire.²⁸ These questions of utility rates and the dominance of the IOU model in the United States have reasonably led to an interest in public power or alternative models to the IOU as a pathway to cheaper, more equitable energy generation, transmission, and use. Still, questions remain regarding the benefits and drawbacks of different utility models and rate structures; fully exploring these questions will be a crucial task for advocates and any state interested in energy justice and climate change adaptation, but is outside the scope of this policy brief. It is clear that wildfires and other climate impacts highlight the need for more analysis, critical thinking, and reevaluation of the predominant utility business model for the last century and the associated financing model of adaptation practices. While this work continues, we advocate for immediate concerns of accessibility, quality of life, and health for vulnerable residents who might be disproportionately burdened by particular rate structures.



Low-income and medically vulnerable residents living in wildland-urban interface areas likely face increased financial burdens from the frequent power shutoffs that are increasingly conducted by utilities in western states; increasing utility rates on these consumers is unjust. These purposeful power shutoffs initiated by utilities have become increasingly common in California, where power shutoffs have become institutionalized through reporting requirements and legal authority granted by the California Public Utilities Commission (CPUC). Nevada has followed suit, with legislation requiring utility planning documents to outline the protocol for conducting purposeful power shutoffs, and consideration of public safety and critical infrastructure.²⁹ Portland General Electric (PGE) in Oregon has conducted a purposeful power shutoff without state policy regulating its authorization or process.³⁰ And Rocky Mountain Power in Utah has considered the use of purposeful power shutoffs during wildfire season, though none were conducted in 2020.³¹ While the cost — both economic and in human life — of utility-initiated wildfires is to be minimized and avoided whenever possible, the widespread use of power shutoffs is not a long-term, viable solution in an era of increasingly dangerous heat waves and reliance on the electricity grid for household, medical, and transportation needs. Unfortunately, the use of power shutoffs is poised to spread throughout the region, as indicated by Oregon’s use of utility-initiated power shutoffs to occur as a wildfire-prevention tool.³² If other utilities in the region join Oregon in imitating’s California’s approach to wildfire prevention and safety, the use of power shutoffs will not be a stopgap activity, utilized only temporarily until appropriate infrastructure upgrades can be completed, but a permanent tool in the adaptation policy toolkit.

Widespread use of power shutoffs as a wildfire-prevention tool can have devastating effects on vulnerable populations.³³ Of particular concern are residents who rely on medical devices that require power to operate. In California, utilities are required by law to provide early warning to medically vulnerable ratepayers before a purposeful power shutoff occurs.³⁴ These ratepayers are also generally eligible for discounted rates, but no independent estimate of number of medically vulnerable people who are eligible for these programs exists; this makes it likely that the program is under-enrolled.³⁵ Regardless, even with advanced warning, power shutoffs and fires leave vulnerable customers stranded without access to electricity-powered medical equipment, refrigerators for storing medicine, food, and breast milk, or air conditioning during the summer.³⁶ While power shutoffs are utilized to prevent wildfires, utilities should work to ensure that all customers are informed about the process of a power shutoff, and are reimbursed for expenses due to these power shutoffs. The question of decision-making authority is relevant as well — utilities have generally been allowed to determine their own weather-related thresholds that will trigger a power shutoff with no community input or public accountability. Similarly, infrastructure upgrades that increase energy resilience (such as installing microgrid technology or energy storage capabilities) are driven by utility plans, outside a public accountability or input process.

While the cost — both economic and in human life — of utility-initiated wildfires is to be minimized and avoided whenever possible, the widespread use of power shutoffs is not a long-term, viable solution in an era of increasingly dangerous heat waves and reliance on the electricity grid for household, medical, and transportation needs.

Evaluation Metrics:

- Utilities should be required to invest in infrastructure and upgrades that incorporate the future, expected effects of climate change, especially increased risk of wildfire.
 - These investments should center around decentralized grid solutions, such as microgrids, and should anticipate a shift towards renewable energy generation sources and a greater reliance on battery storage.
 - Utilities should focus on grid resilience for emergency scenarios, such as grid blackouts, heat waves, natural disasters, or other disruptive events. This will likely entail overbuilding or overlapping infrastructure, such as microgrids and battery storage systems that act as backup sources of energy for communities in the event of wider grid failure. This approach can be used in conjunction with demand-response and energy efficiency programs.
- Utilities should release equity reports, with vulnerable customers identified and provided with procedural and material support (such as reduced rates, streamlined bureaucracy, and additional help and resources during power shutoffs).
- The state should require a phasing-out of purposeful power shutoffs over a defined time period, with punitive measures enacted when utilities conduct power shutoffs.

V. COMMUNITY GOVERNANCE, TRANSPARENCY, AND ACCOUNTABILITY

During disasters, community governance, transparency, and accountability requirements are often relaxed in order to streamline any bureaucratic processes that might prevent resources from being distributed to those in need. However, climate change will be a “slow onset” disaster, occurring over decades, not days. Therefore, community governance, transparency, and accountability requirements must be adapted and maintained, in order to maintain democratic, public governance and oversight of the decision-making process and ensure that community priorities are centered in policy. Community governance and oversight is doubly necessary in the wake of natural disasters, after which the crises of public budget cuts, bankruptcy, human migration, and infrastructure breakdowns can lead to massive privatization campaigns; this process is currently unfolding in Puerto Rico post-Hurricane Maria as the energy sector, destroyed by the hurricane, is being privatized, with energy rates expected to increase significantly under new ownership.³⁷ An investment in increased community governance, transparency, and accountability measures will build democratic and state capacity for responding to future disasters and increasing community resilience.

Community governance, transparency, and accountability institutional policies must be established prior to any natural disasters, taking into account anticipated effects of climate change. Community governance requires that individuals and community-based organizations are leading the policy-making process, not simply rubber-stamping decisions made without community input. Transparency policies center around making information available to the public for free, and ensuring that the language used is accessible. Data transparency is equally important, including spatial mapping tools. These tools facilitate accountability by ensuring that the public can understand which communities are vulnerable to environmental, energy, and climate injustice, and where the funding associated with climate change adaptation programs is being spent.

Evaluation Metrics:

- Community input and governance is incorporated into policy development, enactment, and evaluation practices.
 - Community input must be meaningful and solicited in good faith, in all stages of the policy-making process.
 - Community governance relies on the social ties between community members and the in-depth knowledge of individuals regarding their local neighborhood conditions. The state should incentivize and facilitate both informal and formal methods of community governance.
- Equity mapping projects are developed or in development.
 - These mapping projects should include the location of community resilience centers (discussed below), and any communities affected by purposeful power shutoffs.
- Communities vulnerable to the effects of climate change (including low-income communities, communities of color, environmental justice communities, and the medically vulnerable) are identified using spatial mapping, and are prioritized for funding projects by utilities and government entities.
- Development of climate change adaptation programs and public information regarding disaster risk, extreme weather events, and purposeful power shutoffs must be accessible to all, including non-English speaking communities and households without Internet or smart-phone access.
- The state should have oversight of utility climate change adaptation programs, and should require transparency in all utility actions, including purposeful power shutoffs.
 - This oversight must include targeted, language-appropriate outreach to all customers that will be impacted by a purposeful power shutoff, with a particular focus on medically vulnerable residents who rely on electricity access for health reasons.

EVALUATING STATE CLIMATE ADAPTATION POLICIES

The following evaluation metrics are derived from our analysis in the preceding section. We recognize that these criteria do not fit neatly within one level of governance or policy-making, and no single group of decision-makers has control over these items. However, to the extent possible, we have attempted to frame these criteria in terms of state governance. This checklist is designed to be used as an advocacy tool for local activist groups focused on climate, energy, environmental, and economic justice to lead the conversation on climate change adaptation in their state.

There is no scoring mechanism in this checklist, and it is purposefully a mixture of yes/no questions with space for contextual or qualitative notes. States can be compared using this framework.

California

I. State Strategic Planning

State-level wildfire adaptation plan exists	Yes (California's Wildfire and Forest Resilience Action Plan)
Plan is periodically updated with new information	Yes (regular reports on progress is anticipated and outlined in the Plan)
State agency has ownership of the plan	Yes (Governor's Forest Management Task Force: California Natural Resources Agency; California Environmental Protection Agency; and Department of Forestry and Fire Protection)
Climate change informs plan	Yes ("climate change extends the periods of wildfire risk and enhances the likelihood of fires")
Plan explicitly includes justice and equity	No
Plan explicitly includes community governance, transparency, and accountability	Mixed (Goal 4: Expand and Improve Monitoring, Reporting, and Decision-Support Tools includes transparency and accountability; community governance not included)
Benchmarks or measurable outcomes are included	Mixed (goals and key actions are identified; not all actions have measurable outcomes or goals)
Funding is associated with the plan	Yes (SB 85 provides one-time funding to support the plan; legislature provided further funding for three years)

II. Funding Structures

Wildfire related funding is adequate to meet costs	No (funding is dependent on cap-and-trade auction revenues, which fluctuate)
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Fire suppression funding is insulated and separate	No (suppression and prevention funding is within one program)
Funding is progressive	Mixed (funding to implement the plan comes from the General Fund and the Greenhouse Gas Reduction Fund (GGRF), which are not explicitly progressive taxation structures; GGRF has directed 50% of expenditures from the fund to disadvantaged and low-income communities)
State funding is available for community resilience centers	Yes (Department of Food and Agriculture has \$150M in one-time funding for CRC development)
III. Utility Investments and Decision-Making	
Utilities are required to incorporate climate change into their planning	Yes (CPUC Decision 20-08-046 — a climate change vulnerability assessment is required, but IOUs have not completed their reports)
Utilities are required to implement decentralized infrastructure technology	Yes (CPUC Decision 20-06-017)
Utilities are required to meet certain renewable energy benchmarks	Yes (most recently, Senate Bill No. 100 in 2018; 50% renewable resources target by 2026, 100% by 2045)
Utilities are required to release equity reports regarding vulnerable customers	Mixed (CPUC Decision 20-08-046 — a community engagement plan is required, but not all IOUs have not completed their plans/reports; customers are only identified by participation in the Medical Baseline program, which is likely under-enrolled)
Utilities must conduct specific outreach to individuals and households with accessibility concerns	Yes (CPUC Decision 21-06-034 — requires translation of power shutoff announcement materials and outreach to vulnerable ratepayers)

Utilities are required to phase out the use of purposeful power shutoffs, if in use	No
The state enacts punitive measures when utilities conduct purposeful power shutoffs	No
IV. Community Governance, Transparency, and Accountability	
Community input in strategic planning is meaningful	No (California Forest Management Task Force does not include community groups or members; community input on publications is after the documents are drafted)
Community governance is incorporated into the energy sector's climate change adaptation policy process	No (community ownership only discussed, not enacted , after PG&E's bankruptcy)
Public maps and data on climate change effects are made available	Yes (California Climate Change Adaptation Maps)
Public maps and data on demographic and environmental vulnerabilities are made available	Yes (CalEnviroScreen)
Public maps and data on wildfire risk are made available	Mixed (maps include address look-up tools, but no information by census tracts or zip codes which would allow for layering over other sociodemographic or environmental, energy, and climate justice data - for example, data from CalEnviroScreen)
Public maps and data on the wildland-urban interface are made available	Yes (California Department of Forestry and Fire Protection's Fire and Resource Assessment Program)

VI. LOCAL RESILIENCE

While local resilience initiatives are, by definition, carried at the municipal, city, or neighborhood level, there is an important role for the state to play in facilitating local resilience initiatives and funding these efforts. Such facilitation efforts should include a community-led process for determining the material needs of residents during disaster situations (such as air conditioning or heat, healthy food, childcare, clean water, charging stations for medical equipment, laptops or cell phones, or internet or cellular service); the health risks affecting the population in question (such as high rates of asthma, high blood pressure, the presence of young children or the elderly, risks from smoke inhalation or poor water quality); and the existing social ties between residents (such as neighborhood councils, local nonprofit groups with extended community networks, mutual aid groups, and food pantries).

No single local resilience project will be universally replicable due to such contextual factors. However, we can look at the success of local resilience projects that decreased vulnerability to the effects of climate change, and draw from these examples to outline guiding principles for such projects. We highlight four examples of local resilience projects as a starting point for states to begin considering development of such projects.

After Hurricane Maria struck Puerto Rico in 2017, most residents were without power. This left them with no way to charge essential medical devices or oxygen tanks, much less cell phones. Luckily for some residents of Adjuntas, solar power on the roof of a nearby NGO, Casa Pueblo, enabled them to get critical resources, charge their devices, maintain a working radio station, and allow elderly neighbors to charge oxygen machines.³⁸ Before Maria, Casa Pueblo already served as a community center. During the storm, the space was transformed into a “makeshift field hospital,” providing emergency resources well before FEMA arrived.³⁹ Casa Pueblo is an example of an existing mutual aid organization whose historical focus on renewable energy and environmental justice allowed the group’s physical infrastructure to remain operational during Hurricane Maria.

While rooftop solar is an important source of renewable energy generation and household resilience, microgrids offer a mechanism for larger communities to maintain power when service is interrupted elsewhere. Microgrids rely on local energy generation, which has traditionally been diesel-powered; however, the use of solar PV and energy storage allows for cleaner and safer energy generation.⁴⁰ The Blue Lake Rancheria tribe’s



microgrid serves as a valuable example of how crucial continuous access to power is for medically vulnerable people. The microgrid project was implemented by the federally recognized Blue Lake Rancheria tribe, located in Humboldt County, California.⁴¹ The tribe partnered with the Schatz Energy Research Center at Humboldt State University to develop and build a microgrid. The microgrid includes a 420kW solar PV system and a 950kWh battery energy storage system, with a backup diesel generator. The microgrid is connected to PG&E distribution systems, but can be fully islanded if the grid is out. During the October 2019 purposeful shutoff events, Blue Lake Rancheria remained powered, and was able to provide hotel rooms for several people that needed to charge medical devices.

Resilience to the effects of climate change, including heat waves and natural disasters, has often been analyzed in the context of physical infrastructure; however, the social networks embedded in a community are just as important as solar panels, battery storage, and microgrid technology.⁴² Community engagement and governance should be centered in disaster preparation, especially when planning the construction, ownership, and operations of resilience centers.⁴³ As discussed extensively in the Asian Pacific Environmental Network's report on resilience to natural disasters, community organizations and local residents can shape resilience policies to best suit the needs of their communities, expanding the use of resilience centers beyond the problems that can be understood from a distance through data collection, mapping, and physical infrastructure knowledge.⁴⁴ The city of Berkeley, California, is implementing local resilience through creating a network of community resilience centers.⁴⁵ This network is utilized to build disaster supply caches and provide disaster relief training to trusted community organizations, with the first round of program resources targeting institutions that serve historically vulnerable communities. San Francisco, California is similarly working to create a network of community organizations that share information, conduct drills, and meet regularly in order to facilitate resilience to disasters and build resilient neighborhoods.⁴⁶ The focus on strengthening connections between neighbors and a community's social capital is crucial to building local resilience.

These examples, combined with community-based research on local resilience, highlight the following recommendations for state facilitation of local resilience projects:

- States should initiate a process for determining health, environmental, and safety risks relevant to the locality in which the community resilience center is located. Examples of these risks include smoke inhalation risk, power grid blackouts, flooding risk, heat waves, diesel generator operation safety and pollution, etc.
- Local, municipal, and city governments should be empowered to establish networks of resilience centers in order to share information and coordinate efforts. States should facilitate efforts at network-building and provide technical, administrative, and financial support when necessary.
 - State support should include funding for any staffing shortages or under-resourced programs in public health and emergency response sectors at the local and state level.
- Community governance should be prioritized, with local input in planning processes, community ownership of the physical infrastructure associated with a resilience center, and decision-making power.
- States must fund and facilitate communication networks and energy infrastructure that can operate during disaster situations.
 - Preparedness information should be made available in multiple languages and in a way that enables vulnerable communities to have access to information and resources.
 - Resilience centers should be linked in a network that enables information sharing between centers and to community members.
 - Microgrids, renewable energy generation, and battery storage are key to ensuring that communities are resilient to power outages, whether due to environmental conditions or utility actions.
- Existing neighborhood-level mutual aid networks, and community-based organizations should be included in plans for community resilience and community resilience centers. These existing networks are particularly important support mechanisms for undocumented people, the unhoused, and other vulnerable populations.

VII. CONCLUSION

While this policy brief focuses on climate change adaptation in the context of increased risk of wildfire, many of the recommendations we provide are applicable to other regions of the United States. The principles of state strategic planning regarding climate change adaptation; allocating funding for climate change adaptation work; utility investments and decision-making; community governance, transparency, and accountability; and local resilience provides a useful framework for extreme heat or cold, flooding, hurricanes, or other natural disasters.

In this policy brief, we reference “natural disasters” frequently. However, the recent power outages in California and Texas have made it clear that there are no natural disasters — all environmental and weather conditions interact with human infrastructure to create disaster situations, in which the most vulnerable are disproportionately affected.⁴⁷ For example, wildfires can be directly caused by human action or by “acts of God,” but the increasingly hot and lengthy summers, the drought conditions, the buildup of fuel, the use of purposeful power shutoffs by utilities to reduce the risk of sparks, and the presence of communities in formerly wild areas all co-constitute the natural disaster of a wildfire. In Texas, while the 2021 cold snap that led to massive power outages across the state was not the direct result of human action, the isolation of Texas’s energy grid, the weathering decisions made for natural gas power plants, and the lack of local, renewable energy generation and storage options combined to create a disaster situation. These decisions were made in the years, decades, and even centuries before the events of 2020 and 2021 that dominated news headlines; the decisions we make in the next decade will determine the health of our communities and ecosystems for years to come. This policy brief offers a guide for states to begin considering what strategies can be utilized in order to avoid future disasters informed by the principles of energy justice.

ENDNOTES

Acknowledgements

We would like to thank Antonio Coronado for his work in compiling western state approaches to utility-initiated power shutoffs during high wildfire threat weather conditions and wildfire adaptation and mitigation planning, work which was invaluable in shaping and contributing to this policy brief. In addition, we would like to thank Pete Woiwode and Alessandra de la Torre for their invaluable comments on earlier drafts of this policy brief. Any errors or omissions are our own.

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